

Borehole

51-00-10

Log Event A

Borehole Information

Farm : <u>TX</u>	Tank : <u>TX</u>	Site Number : <u>299-W15-75</u>
N-Coord : <u>42.007</u>	W-Coord : <u>76.056</u>	TOC Elevation : <u>670.23</u>
Water Level, ft :	Date Drilled : <u>3/31/1949</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.313</u>	ID, in. : <u>8</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>150</u>	

Borehole Notes:

This borehole was drilled in February 1949 and was completed at a depth of 150 ft with 8-in. casing. The driller's log states that the casing was perforated. Information in Hanford Wells (PNL-8800) indicates that the interval from 40 to 100 ft is perforated. There is no indication that the bottom of the borehole was cemented or that grout was placed in the borehole.

The casing thickness is presumed to be 0.322 in., on the basis of published thickness for schedule-40, 8-in. steel casing.

The top of the casing is the starting depth for the logs. The casing collar is about even with the ground surface.

Equipment Information

Logging System : <u>1</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>04/1996</u>	Calibration Reference : <u>GJPO-HAN-3</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>4/25/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>34.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>4/26/1996</u>	Logging Engineer: <u>Bob Spatz</u>
Start Depth, ft.: <u>147.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>44.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>3</u>	Log Run Date : <u>4/29/1996</u>	Logging Engineer: <u>Mike Widdop</u>
Start Depth, ft.: <u>45.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>33.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

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Analysis Information

Analyst : H.D. Mac LeanData Processing Reference : P-GJPO-1787Analysis Date : 2/24/1997**Analysis Notes :**

Logging of this borehole by the SGLS was completed in three logging runs. The pre-survey field verification spectra acquired prior to each logging run did not pass the acceptance criteria established for the peak shape and system efficiency. A nonconformance report (NCR) issued in August 1996 (N-96-05) identified this failure as a power supply malfunction that resulted in a low detector bias voltage being supplied to the logging tool. This malfunction occurred during the mornings; an extra long warm-up period was required to bring the system to its optimal operating condition. The NCR also documents that concentrations calculated from data collected in the first 2 hours of logging could be systematically underestimated by about 10 percent. Therefore, some data from all of the logging runs may show a repeatability problem upon relogging of the borehole in the future.

The post-survey field verification spectra acquired immediately following completion of the logging runs met the acceptance criteria for the peak shape and system efficiency, providing evidence the logging system was operating appropriately after an extra long warm-up time. The energy calibration and peak-shape calibration from verification spectra that successfully met the acceptance criteria were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation. During logging operations, the system gain remained stable; it was not necessary to make corrections for gain drifts during data collection or during processing of the data to maintain proper peak identification.

Casing correction factors for a 0.322-in.-thick steel casing were not available during analysis. A correction factor of 0.330 was applied, which will cause the calculated concentration to be slightly higher than the actual concentration.

Depth overlaps, where data were collected by separate logging runs at the same depth, occurred in this borehole between 33 and 34 ft and between 44 and 45 ft. The calculated concentrations of the natural radionuclides using the separate data sets at the overlapping depth points were within the 2 sigma (95-percent confidence level) of the measured concentrations, indicating very good repeatability of the gamma-ray energies used to calculate the radionuclide concentrations.

Cs-137 was the only man-made radionuclide identified in this borehole. Cs-137 was detected from the ground surface to 2 ft, 38 to 44.5 ft, intermittently from 44.5 to 46.5 ft, from 59.5 to 62 ft, 67 to 68.5 ft, 79 to 80 ft, 85 to 87.5 ft, and at 99.5 ft. The measured concentrations were generally less than 1 pCi/g; however, the contaminant occurs in concentrations of about 2 pCi/g at a depth of 49.5 ft and at the ground surface.

Between the ground surface and 38 ft, the K-40 and Th-232 concentrations increase from a background of about 12 and 0.5 pCi/g, respectively, to a background of about 18 and 0.75 pCi/g, respectively, below about 44 ft. A change in lithology is indicated at a depth of 97 ft by a slight increase in the U-238 and Th-232 background concentrations. An abrupt decrease in K-40 and Th-232 concentrations occurs between depths of 105 and 117 ft. A further lithological change at a depth of 132 ft is indicated by the slight decrease in the measured K-40 and Th-232 concentrations below this depth.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank TX-118.



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Log Plot Notes:

Separate log plots show the man-made radionuclides (Cs-137) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes both the man-made and natural radionuclides, in addition to the total gamma derived from the spectral data and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.